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09/006,999	01/14/1998	CLIVE J. SHIFF	PMS241460	4395

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EXAMINER

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2855

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 03082004

Application Number: 09/006,999
Filing Date: January 14, 1998
Appellant(s): SHIFF ET AL.

Ann S. Hobbs, Ph.D.
For Appellant

EXAMINER'S ANSWER

MAILED
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This is in response to the appeal brief filed 18 February 2004.

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(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. An appeal, not mentioned in the brief, was earlier filed (12 December 2000) on the instant application.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellants' brief includes a statement that claims 1, 4, 6-8, and 10-12 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

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(9) Prior Art of Record

Mudambi et al. "Mirex in Oswego River and Lake Ontario Water Columns",

Proceed. 26th Conf. Great Lakes Res. (May 1983) page 32.

Whitmore et al. "Comparison of Methods for Recovery of Cryptosporidium from

Water", Wat. Sci. Tech Volume 27, No. 3-4, (1993), pages 69-76.

5,019,497	OLSSON	05-1991
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5,846,439	BORCHARDT et al.	12-1998
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5,866,071	LEU	02-1999
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(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Mudambi

(Proceed. 26th Conf. Great Lakes Res., May 1983). Mudambi discloses a

continuous flow apparatus comprising a continuous flow centrifuge and a XAD-8

filtration column. XAD-8 is a particulate material composed of micron-sized

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polyaromatic particles, disclosed here to be packed into a column which restricts large-diameter molecules from passing through.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 6-8, and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Whitmore (Wat. Sci. Tech. 1993) in view of Olsson (US 5,019,497). Whitmore discloses the claimed invention, a continuous flow centrifuge and method for using the centrifuge to recover cryptosporidium from water (pages 69 and 72), except for the use of a particulate column in the centrifuge apparatus. Olsson teaches the use of a particulate column (Sephadex) mounted in a centrifuge tube to catch the flow through containing a desired sample material (column 7, lines 10-23). It would have been obvious to use a particulate column as taught by Olsson in the invention taught by Whitmore to filter the desired material (cryptosporidium) from water, since this would eliminate the tedious deposit transferal steps (involving scraping material from the centrifuge and rinsing with water). Further motivation is provided by Whitmore in the abstract, which states that "continuous flow centrifuges tested were not shown to be capable of yielding satisfactory recoveries, although it is

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considered more refined machines currently available may warrant investigation"; thus pointing for the need for an improved centrifugation recovery apparatus.

With respect to the choice of particulate material for cryptosporidium, Whitmore teaches that sand can be used as a particulate filter which retains cryptosporidium (page 71). It would have been obvious to use sand as taught by Whitmore as the particulate filter material as taught by Whitmore in view of Olsson, since sand is shown to retain the desired material (cryptosporidium).

With respect to claims 10-11, the claimed invention is taught by Whitmore in view of Olsson as stated above, except for the size ranges stated. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use sand of 200-50 micrometers or 120-50 micrometers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum of workable ranges involves only routine skill in the art. See *In re Aller*, 105 USPQ 233. Additionally, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Claims 1, 4, 6-8, and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borchardt (US 5,846,439) in view of Leu (US 5,866,071).

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Borchardt teaches a continuous flow centrifuge (column 3, lines 64-67) used to filter *Cryptosporidium* oocysts from a solution (column 4, lines 37-55).

With respect to claim 1, Borchardt teaches the claimed invention except for the use of a particulate filtration column. Leu teaches the use of a particulate filtration column in a centrifuge (figures 4a, 4b, 4c; column 2, lines 62-65; column 3, lines 4-9 and 27-40) to enhance the separation abilities of the centrifuge (column 1, lines 13-23). In the apparatus of Leu. In the apparatus of Leu, a column is packed with finely divided dextran particles (column 4, lines 35-53). The particulate material in the column consists of several different zones (d1-d5) of dextran concentration. When sample material (P0), such as cellular solutions (column 4, lines 35-36) to be filtered is placed in the column, operation of the centrifuge forces the sample material to be forced through the dextran particulate material. The sample material (layer P0 in Figure 4a) is filtered into its constituent parts (layers P1,P2,P3 in Figure 4b) through dextran layers (d2-d4) by the interaction of the sample with the particulate material (column 4, lines 46-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the column of Leu in the continuous flow centrifuge of Borchardt since Leu states that the addition of a media column increases the separation ability of the centrifugation; during centrifugation, analytes are separated into different media according to their densities (column 3, lines 39-40). Without such a media column, centrifugation results in a pellet consisting

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not only of the desired cellular material, but also containing other fragmentary material which is not desired.

With respect to claims 4 and 12, Borchardt in view of Leu teaches the claimed invention as stated above except for the use of glass or sand particulate material.

Borchardt discloses that it is known in the art to use sand columns to filter oocysts from water in flow systems (column 2, lines 17-31). It would be obvious to use sand columns in the centrifuge of Borchardt in replacement of the media of Leu, as sand columns are known to filter oocysts.

With respect to claims 6-8, Borchardt teaches that it is known in the art to perform microorganism, cryptosporidium in particular, concentration in a fluid stream of a continuous flow centrifuge (column 2, lines 41-42).

With respect to claims 10-11, the claimed invention is taught by Borchardt in view of Leu as stated above, except for the size ranges stated. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use sand of 200-50 micrometers or 120-50 micrometers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum of workable ranges involves only routine skill in the art. See *In re Aller*, 105 USPQ 233. Additionally, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not

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perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

(11) Response to Argument

Rejection over Mudambi et al.

In attempting to overcome the rejections applied to the claims, appellants' representative argues that an column filled with particulate matter which separates mirex from solution is not a "filtration column of particulate material" as claimed. Appellants agree that the XAD-8 "matrix" removes molecules of the contaminant from the liquid, but draws a distinction between "adsorption" and "filtration". However, as set forth in the previous office action, "filtration" is a broad term relating to removal of suspended matter. According the dictionary (Merriam-Webster's 10th Collegiate Ed.), filtration is defined in the following manner:

Filtration: the process of passing through or as if through a filter. Filter: a porous article or mass (as of paper or sand) through which a gas or liquid is passed to separate out matter in suspension.

Clearly, then, passing a fluid through an adsorbent medium such as XAD-8 which restricts large-molecule particles from passing through qualifies as a filtration. Furthermore, applicant's representative's definition of XAD-8 as merely an "adsorbent" is inadequate, since a packed column of XAD-8 as presented in the Mudambi reference forms a filter which allows particles having a certain size or smaller to pass while restricting the passage of larger molecules. The Mudambi

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reference discloses the use of a particulate column composed of XAD particles (XAD-8). Information on XAD is provided from the manufacturer's website (<http://www.ionexchanger.com/Pharmaceuticals/xad.htm>), as was made of record in the Office Action of 31 October 2002.

With respect to the remaining arguments against the rejection, it is noted that the features which are relied upon (i.e., separate filtration and centrifugation steps, or the "concept of the present invention" as stated on page 4 of the appeal brief), are not set forth in the claims. It is the claims that define the claimed invention, and it is claims, not specifications that are anticipated or unpatentable.

Rejection over Whitmore et al. in view of Olsson

With respect to the argument that the filter is not taught to be "within the centrifuge", such a feature is not set forth in the claims. It is the claims that define the claimed invention, and it is claims, not specifications that are anticipated or unpatentable. The claims require only that a "filtration column of particulate material" be "[i]n a continuous flow centrifuge apparatus". The claim sets forth a column to be in the apparatus (the collection of all parts of the structure), not "within" any certain part of the centrifuge.

With respect to the argument that no suggestion is present to combine the references, the rejection stated that "this would eliminate the tedious deposit transferal steps (involving scraping material from the centrifuge and rinsing with

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water)” which were required in the method of Whitmore, replacing those steps with a simple insertable particulate column to catch the desired material.

The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, the strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. In re Sernaker, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983).

In this case, Whitmore even points to the desirability of improving the recovery by stating, “continuous flow centrifuges tested were not shown to be capable of yielding satisfactory recoveries, although it is considered more refined machines currently available may warrant investigation”; thus pointing for the need for an improved centrifugation recovery apparatus. Olsson teaches such an improved recovery apparatus for small particles which captures particles in a size-specific matrix and removes the need for time-consuming and inefficient manual scraping of the deposits.

The final argument against the rejections based upon Whitmore in view of Olsson concerns the use of sand as the particulate filtration material. Whitmore teaches that it is known in the art for sand to be used as a particulate filter which retains cryptosporidium (page 71). Despite appellants’ comments on “teaching away”

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from the use of sand, Whitmore states in the abstract at page 69 that “laboratory scale sand columns were also evaluated [for *Cryptosporidium* retention]. The retention within the column material was satisfactory at low rates.” Clearly, then, some advantage or expected beneficial result would have been produced by the use of sand as a particulate filtration material. Interestingly, even the dictionary definition presented above mentions sand as an example of a filtration material, demonstrating the ubiquitous nature of sand as a filtration material.

Rejection over Borchardt et al in view of Leu.

While appellants state that this rejection was vacated by the Board in the Decision dated 27 September 2002, this is not precisely true, since the current rejection is in quite different form from the previously vacated rejection. The current rejection specifically denotes the particulate material in the column taught by Leu as consisting of several different zones (d1-d5) of dextran concentration. The sample material (layer P0 in Figure 4a) is filtered into its constituent parts (layers P1,P2,P3 in Figure 4b) through dextran layers (d2-d4) by the interaction of the sample with the particulate material (column 4, lines 46-50). While appellants correctly describes this process as “density gradient” centrifugation, it is respectfully argued that contrary to appellants’ position, this is a filtration process, and that the dextran layers do form a filtration column of particulate material. As defined by Merriam-Webster:

Filtration: the process of *passing through* or as if through a filter.

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Filter: a porous article or mass (as of paper or sand) through which a gas or liquid is passed to *separate* out matter in suspension.

Particulate: of or relating to minute separate particles.

Particle: a minute quantity or fragment; any of the basic units of matter and energy (as a *molecule*, atom, proton, electron, or photon).

In setting forth the teaching of Leu, the "filtration column of particulate material" was equated to the layers of dextran solution in the centrifuge tube. The questions, then are: (1) is dextran solution a particulate material, and (2) does the dextran solution perform a filtration function.

Dextran is a particulate material. Since dextran is a minute *molecule*, it certainly qualifies as a particle. Dextran particles can be obtained (e.g., from supplier Sigma-Aldrich) at specified molecular weights for purposes such as gel permeation chromatography.

Dextran performs a filtration function. In the method of Leu at column 4, lines 35-53, a cell sample is *passed through* dextran layers such that pancreatic islets and cells are *separated* into different dextran layers. This can be seen in Figures 4a-4b. In Figure 4a, the sample (P0) is placed between layers of dextran (d1 and d2) in a tube. After centrifugation, the sample is spread out into multiple layers (P1, P2, P3) which have passed through at least dextran layer (d2), see Figure 4b. Some components of the sample have also passed through other dextran layers (d3 and d4). If there were no dextran in the tube, the sample would not be separated into components; instead, the solids in the sample would

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form a hard, dense pellet in the bottom of the tube which would require further treatment to separate out desired material from undesired solid contamination. Clearly, the dextran layers filter the sample solution into a number of component layers.

For yet further proof, see U.S. 3,928,139 to Dorn, which discloses a system nearly identical to that of Leu, comprising a centrifuge tube containing a liquid sample and a dextran medium which undergoes density gradients centrifugation to separate the liquid sample into its constituent members; see column 3, lines 28-48 and column 5, lines 19-48. The dextran medium is explicitly described as a "filter medium". The centrifugation process is stated (at column 3, lines 38-41) to "force the fluid sample against the liquid filter medium and cause the microbial pathogens to selectively pass therein and thereby separate from the mass of the body fluid sample". The dextran is most certainly particulate as it is composed of particles, specifically, polymeric dextran particles "having a weight average molecular weight in the range of from about 10,000 to about 2,000,000"; see column 5, lines 39-42.

Therefore, Leu teaches "a filtration column of particulate material" as applied in the rejection against the claims. While the description of dextran as being provided in units of volume at a certain percent concentration may be novel to those unfamiliar with the intricacies of modern analytical chemistry, the use of particles such as dextran (or Sephadex) in such a manner to separate biological macromolecules is used extensively; see page 394 of Allcock's Contemporary Polymer Chemistry.

Another argument presented by appellants against the rejections based upon Borchardt in view of Leu concerns the use of sand as the particulate filtration material. Despite appellants' comments that "generally", Borchardt mentions the use of sand as failing to adequately separate oocysts from water, Borchardt does teach that it is known in the art to use sand columns to filter oocysts from water in flow systems (column 2, lines 17-31), citing the Borchardt references which states that the "retention within the column material was satisfactory at low rates." Clearly, then, some advantage or expected beneficial result would have been produced by the use of sand as a particulate filtration material, at least at some flow rates. Interestingly, even the dictionary definition presented above mentions sand as an example of a filtration material, demonstrating the ubiquitous nature of sand as a filtration material.

Applicants further argue that no motivation is suggested for the combination of Borchardt and Leu, and that the two processes are "inherently different". Borchardt is directed to a centrifuge which may contain media for improved filtration of oocysts (see particularly column 5 lines 2-5); Leu is directed to a centrifuge which contains media for improved filtration of cells. Both references are deemed to be within the field of appellants' endeavor, which is a centrifuge apparatus which contains media for improved filtration of microorganisms such as oocysts. See *In re Wood*, 202 USPQ 171, 174.

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As Leu teaches, the addition of a media column increases the separation ability of the centrifugation of cellular particles; during centrifugation, analytes are separated into different media according to their densities (column 3, lines 39-40). Without such a media column, centrifugation results in a pellet consisting not only of the desired cellular material, but also containing other fragmentary material which is not desired. Clearly, then, some advantage or expected beneficial result would have been produced by the use of a particulate filtration material.

With respect to the remaining arguments against the rejection, it is noted that the features which are relied upon (i.e., replaceable tubes, certain flow ranges, complexity of the invention, as stated on page 6 of the appeal brief), are not set forth in the claims. It is the claims that define the claimed invention, and it is claims, not specifications that are anticipated or unpatentable.

In summary, appellants have presented a number of arguments that attempt to overcome anticipation and obviousness rejections applied to the claims of the instant application. Appellants attempt to redefine the term "filtration" to an unspecified meaning that is narrow enough only to somehow distinguish over particulate columns such as taught in Mudambi or Leu. According to appellant's definition, a common automobile oil filter would not be called a "filter", since it acts to adsorb contaminant particles. Appellants attempt to negate obviousness-based rejections with arguments based upon unclaimed subject matter, or by

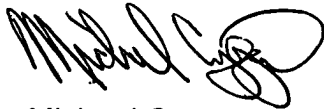
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arguing that two centrifuges containing media for particle separation are non-analogous art. Appellants attempt to overcome the teaching of the desirability of combination of teachings through selectively citing sections of the applied references which disclose disadvantages in certain situations of a certain technique and omitting or downplaying other sections which disclose the advantages and expected benefits of such techniques. This response has considered each argument on its merits, but has found no convincing argument which would permit the withdrawal of any of the applied rejections.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Art Unit 2855



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March 8, 2004

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